

Application No.: 09/928,177

Docket No.: JCLA7624

**REMARKS****Present Status of the Application**

The Office Action rejected all presently-pending claims 1-47. Specifically, the Office Action rejected claims 1-6 under 35 U.S.C. 103(a), as being unpatentable over Zhou (U. S. Patent 6,356,036) in view of Piwonka-Corle et al. (U. S. Patent 5,608,526), Badami et al. (U. S. Patent 6,181,420) and Perov et al. (U. S. Patent 6,356,036). The Office Action also rejected claims 7-23 under 35 U.S.C. 103(a), as being unpatentable over Zhou in view of Piwonka-Corle et al., Badami et al. and Perov et al.. The Office Action rejected claim 24 under 35 U.S.C. 103(a), as being unpatentable over Daval et al. (U. S. Patent 3,758,194). The Office Action rejected claims 25-47 under 35 U.S.C. 103(a), as being unpatentable over Zhou in view of Piwonka-Corle et al., Badami et al., Perov et al., and Daval et al.. Reconsideration of those claims is respectfully requested.

**Summary of Applicant's Invention**

The Applicant's invention is directed to a multi-functional opto-electronic system that is mainly applied to the real-time metrologies of biomedical or biochemical reactions as well as the in-situ manufacturing measurements of biochips. The configuration of this system is built up by integration of at least four different near-field optical metrological principles , which share a part of common optical path design and allow to turn on several functions such as ellipsometer, Laser Doppler vibrometer or interferometer (LDV/I), surface plasmon resonance (SPR) for amplitude and phase detection, phase shifting interference microscope, photon tunneling

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microscope, optical coherence tomography (OCT) and imaging microscope by switching few components in the system. With the creation of a novel opto-mechanical design and its associated signal processing methodologies, both the signal detection of the biomedical reactions and biomedical imaging concerned for the future trend in the modern biomedical sciences are achieved with high resolutions.

#### **Discussion of Office Action Rejections**

The Office Action rejected claims 1-23 under 35 U.S.C. 103(a), as being unpatentable over Zhou in view of Piwonka-Corle et al., Badami et al. and Perov et al.. The Office Action rejected claim 24 under 35 U.S.C. 103(a), as being unpatentable over Daval et al.. The Office Action rejected claims 25-47 under 35 U.S.C. 103(a), as being unpatentable over Zhou in view of Piwonka-Corle et al., Badami et al., Perov et al., and Daval et al.. Applicants respectfully traverse the rejections for at least the reasons set forth below.

The present invention is directed to a multi-functional opto-electronic system that is mainly applied to the real-time metrologies of biomedical or biochemical reactions as well as the in-situ manufacturing measurements of biochips. In order to have the common optical path shared with different measuring mechanisms, a *variable incident angle optical member 6* in FIG. 2 is particularly used to be incident the biochip 12 by a specific angle. As a result, the variable incident angle optical set 6 allows the light to travel back along the same optical path. By using

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the variable incident angle optical member 6, a large portion of optical paths can be shared by different measuring subsystems.

Independent claim 1 has recited the features as follows:

1. A multifunctional opto-electronic detection system, suitable for use in detection on a biochip, the system comprising:

a linear polarizing light source set, used to provide a needed polarizing light source;

a phase modulation unit, used to modulate a phase of a passing light, so as to change a polarization state of the passing light;

a reference optical analyzing unit, comprising an non-polarizing optical beam-splitter, an analysis plate and a first photodetector and a second photodetector;

*a variable incident angle optical set, comprising a quasi-paraboloidal reflective mirror, a quasi-spherical reflective mirror, and a uniaxial displacement stage that can be controlled by a feedback manner and carry a prism set, wherein the variable incident angle optical set is used to adjust an incident angle of a light onto the biochip;*

an optical signal analysis unit, having an analyzer and a third photodetector; and

a microscope lens set having a camera function, comprising a lens set with a sufficient high power and an array CCD (charges coupled device), so that a reaction situation of bio-molecules can be monitored (*Emphasis added*).

In claim 1, the *variable incident angle optical set 6* is at least not disclosed by the prior art references. Likewise, independent claims 7, 16, 22, 23, 25, 31, and 37 has also recited the variable incident angle optical set 6 in more details, which further includes a reflection member, *a motion platform*, and an optical element set, as also can be seen in drawings.

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In re Zhou, even though the light source 30, the polarizer 31, the splitter 32 and the polarization rotator 34 are disclosed. However, Zhou clearly *failed to disclose the variable incident angle optical set 6 of the present invention.*

In re Piwonka-Corle et al., the spectroscopic ellipsometry is disclosed, in which even though a pair of paraboloid mirrors 16 and 17 are used to guide the light beam from the light source to the fiber 1, Piwonka-Corle et al. failed to disclose the variable incident angle optical set 6 of the present invention.

In re Badami et al., the interferometry system is disclosed. However, Badami et al. also failed to disclose the variable incident angle optical set 6 of the present invention.

In re Perov et al., the portable biochip scanner device is disclosed. However, Perov et al. also failed to disclose the variable incident angle optical set 6 of the present invention.

In re Daval et al., the interferometry modulator is disclosed, likewise, Daval et al. failed to disclose the variable incident angle optical set 6 of the present invention.

Therefore, independent claim 1 is distinguishable over the prior art references.

With respect to independent claims 7, 16, 22, 23, 25, 31, and 37, the variable incident angle optical set 6 is further designed by using the a reflection member, *a motion platform*, and an optical element set to achieve the variable incident angles to the biochip. With at least the same reasons set forth for claims 1, claims 7, 16, 22, 23, 25, 31, and 37 are distinguishable over the prior art references.

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For at least the foregoing reasons, Applicants respectfully submit that independent claims 1, 7, 16, 22, 23, 25, 31, and 37 patently defines over the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-6, 8-15, 17-21, 24, 16-30, 32-36 and 38-47 patently define over the prior art references as well.

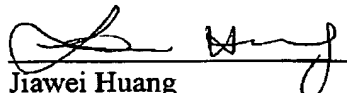
### CONCLUSION

For at least the foregoing reasons, it is believed that all pending claims 1-47 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

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